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Bringing together all aspects of cancer research, prevention and treatment. A report from the 8th NCRI Cancer Conference

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Abstract

The 8th NCRI Cancer Conference took place from 4th until 7th of November 2012 in the BT Convention Centre, Liverpool, UK. This scientific event has established itself as the leading international oncology meeting in the UK and this year attracted more than 2,000 delegates: from researchers and data managers to clinicians, nurses and policy makers. The conference covered six main topics: 1) Diagnosis and therapy 2) Epidemiology and prevention 3) Information, patients and the public 4) Survivorship and end-of-life care 4) The cancer cell and model systems 6) Tumour specific research. This report presents the highlights of the conference.

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BioDiscovery was represented at the conference by its Editor-in-Chief, Managing Editor, Head of Editorial Office and Assistant Editor who gave talks, presented posters and interviewed delegates (see supplemental video).

Cancer Research UK Lifetime Achievement in Cancer Research Prize

The highlight of the conference was the Cancer Research UK Prize ceremony. Professor Sir David Lane received the Cancer Research UK Lifetime Achievement in Cancer Research Prize (Figure 1). As we have written about before, the monumental discovery of the tumour suppressor molecule p53 by Sir David revolutionised our understanding of how cancer cells grow and divide [1].

In his presentation to mark the award, Professor Lane looked back on his career so far. David did his PhD in immunology with Professor Avrion Mitchison in University College London and his first post-doc in the laboratories of the Imperial Cancer Research Fund working with Lionel Crawford. At that time he discovered p53, a protein that interacts with the Large T antigen, and hypothesised that this protein might be involved in control of cell growth [2]. Later Dr Lane joined the

Figure 1. Professor Sir David Lane with the Cancer Research UK Lifetime Achievement in Cancer Research Prize.

Cold Spring Harbor Laboratory where he started writing the book "Antibodies: A Laboratory Manual" published in 1988 [3], which became one of the most successful practical guides in biomedicine. After returning to the UK, David set up his own laboratory with CRC funding at Imperial College London, then moved to the ICRF laboratories at Clare Hall and in 1990 moved to Dundee to help establish the CRC laboratories. In 1996 Professor Lane founded the biopharmaceutical company Cyclacel Ltd and pioneered the use of peptidomimetics as a tool for drug discovery [4-7]. Cyclacel has developed several compounds as cancer drug candidates, which are currently under clinical investigation [8]. Currently Professor Lane is the Chief Scientist of the Agency for Science, Technology and Research (A*STAR) and the Director of the p53 Lab.

In his plenary lecture Professor Lane also shared his vision of the future in which he believes scientists will be able to "drug the undruggable" molecules, which are involved in many cancers, but have proven stubbornly difficult to target with drugs. Moreover, he outlined recent work in targeting 'undruggable' targets such as p53, Myc and Ras. In addition, Professor Lane presented exciting novel discovery methods such as the development of molecules called "stapled peptides". "Stapled peptides" are stabilised peptides, which show exquisite specificity and ability to resist degradation, while acting in a drug-like manner.

Targeting myeloma cells and their microenvironment

Professor Kenneth Anderson, a world-leading expert in myeloma from the Harvard Medical School, presented data showing how survival from multiple myeloma has increased over the last decades due to advances in treatment and new drugs such as bortezomib (Velcade) and lenalidomide (Revlimid). Professor Anderson argued that new rationally-based combination therapies are essential to the treatment of refractory multiple myeloma. He also suggested that targeting the tumour in its microenvironment and development of personalised therapies are the approaches that could bring forward a real prospect of long-term survival for myeloma patients.

Clinical cancer genetics in the era of personalised cancer medicine

Professor Judy Garber form Dana-Farber Cancer Institute, Boston discussed how fast-developing DNA sequencing technologies and the reduced cost of whole genome analysis present scientists and clinicians with the opportunity to develop and implement systems that incorporate cancer genomics into practice. Professor Garber also discussed the ethical issues and challenges posed by genetic sequencing.

Targeting the CRKL/Src family kinases in rhabdomyosarcoma

Dr Lee Helman from the US National Cancer Institute talked about the advancement in understanding rhabdomyosarcoma – the most common soft tissue sarcoma of childhood. His team has identified novel signalling pathways involved in rhabdomyosarcoma survival. Key proteins in these pathways are CRKL and IGFR1. Dr Helman presented data demonstrating that dasatinib is able to inhibit the CRKL pathway and suppress the growth of tumour cells *in vitro* and *in vivo*. In addition he stated that inhibition of the two non-overlapping IGFR1 and CRKL pathways simultaneously by a combination of IGFIR Ab and dasatinib enhances the overall tumour growth inhibition. Ongoing experiments in mice have also shown the same results and, if confirmed, will lead to clinical trials.

Cancer evolution

Several very interesting and provocative lectures concerning cancer evolution were presented in a session chaired by Professor Gerard Evan. He talked about the need to "de-mystify and de-mythologise" cancer, thus removing some of the misconceptions about the disease. "It is important to understand" Professor Evan said "Cancer is not a single, unitary thing, but a phenomenon that constantly changes and evolves." This is the main reason why some cancer treatments can effectively kill tumour cells, but fail to extend life. Molecular evolution allows the remaining cancer cells to "re-wire signalling networks" and evolve ways to resist treatment and grow again. Several other speakers also discussed the need to use evolutionary biology tools to better understand how cancer grows, which will eventually lead to improved treatment and prevention of the disease. Professor Carlo Maley from the University of California discussed how a tumour's genetic diversity affects its response to treatment. He suggested that cancer prevention strategies that reduce the rate of genetic mutation should be exploited. Professor Maley argued that a successful anti-cancer strategy must maintain a stable, non-growing tumour, as killing tumour cells with drugs could inadvertently allow drug-resistant cells to grow faster. In his lecture Professor Mel Greaves from the Institute of Cancer Research also gave evidence supporting the idea of cancer's evolutionary nature. Professor Greaves showed proof that leukaemias are actually a collection of sub-clones, all existing within the same patient. Finally, Professor Peter Campbell, from the world-leading Wellcome Trust Sanger Institute in Cambridge, outlined the idea that cancer evolves dynamically, as clonal expansions supersede or overlap one another, driven by shifting selective pressures, mutation processes and disturbed cancer genes. He suggested that applying complex maths and statistics to detailed genetic

analyses can help the reconstruction of tumours' histories and provide insights into mutational processes, cellular repair pathways and networks associated with cancer development.

Breast cancer

Many plenary lectures and discussions were devoted to all aspects of breast cancer. The NCRI chief executive Harpal Kumar, presented the results of the recent Independent Breast Screening Review. Professor Sir Michael Marmot from the Institute of Health Equity, University College London also discussed the breast screening review. He chairs an independent panel which will carry out a rigorous review of the evidence of breast screening's benefits and harms. The main harm of screening which the panel looked at was that of overdiagnosis. In addition, the leading US cancer researcher Professor Joan Massagué from the Memorial Sloan-Kettering Cancer Center discussed the latest concept of how breast cancers spread; why some breast cancers spread to the bone, whereas others spread to the lungs. Professor Massagué argued that a better understanding of these mechanisms will help the development of treatments to eradicate disseminated tumour cells and prevent metastasis.

Prostate cancer

Dr Robert Bristow, a prostate cancer expert from the Ontario Cancer Institute, Princess Margaret Hospital in Toronto discussed personalised genomic approaches and pathway identification for individualised prostate cancer therapy. According to Dr Bristow men with prostate cancer can be divided into three groups: low, intermediate and high risk. Low risk men have slow-growing tumours that do not need immediate treatment but should be monitored. Intermediate risk men have cancers which are growing but not spreading and are usually treated with surgery and/or radiotherapy. High risk men have aggressive, invasive cancers that need urgent, intensive treatment. Up to 40% of patients with intermediate-risk prostate cancer will fail prostatectomy or precision image-guided radiotherapy. Dr Bristow's research focused on identification of additional genetic prognosticators for stratification patients towards intensified combination therapy. Dr Bristow's team have shown that men with intermediate risk prostate cancer can be divided into four groups according to their respond to treatment. His team is working together with scientists at The Institute of Cancer Research in Surrey to analyse the DNA pattern(s) of prostate tumours. Primary data suggests that the use of personalised genomics may improve the clinical outcome for the patient.

Can aspirin prevent cancer?

The question about aspirin's potential role in preventing cancer was discussed in one of the sessions. Strong evidence was presented that taking regular aspirin could reduce the risk of some cancers, especially bowel cancer. Participants debated whether people should take aspirin, and if so, who would most likely benefit from it given aspirin's serious side effects like internal bleeding. Professor Sir John Burn from Newcastle University reported results from a study involving 937 Lynch syndrome patients which showed 60% fewer cancers in patients taking aspirin. Professor Burn research also suggests that aspirin is beneficial for people at high risk of colorectal cancer.

Conclusion

The 8th NCRI Cancer Conference provided an opportunity for participants representing the whole field of oncology (from researchers and data managers to clinicians, nurses and policy makers) to present their data and to establish trans-disciplinary collaborations.

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